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ABSTRACT

The Ohio Fourth-grade Proficiency Tests, which are described in this information guide, are designed to measure a fourth-grade level of literacy and basic competence. Proficiency tests in writing, reading, mathematics, and citizenship were implemented in March 1995, and a science assessment is planned for March 1996. These tests will be administered annually. The tests have been developed by Ohio educators and the State Department of Education. Learning outcomes were developed for each subject area and test items were written, reviewed, field-tested, and operationalized to establish the tests. Students will have a maximum of 2.5 hours to finish each test, although it is expected that each test will take about 75 minutes. The writing test is defined by nine learning outcomes in two writing activities that call for prewriting, writing, revising, and editing. Twenty learning outcomes define the reading test, items of which are based on fiction, poetry, and nonfiction. Each test form will contain multiple-choice, short-answer, and extended-response items, as do all the other proficiency tests. The mathematics test is defined by 25 learning outcomes developed from the 8 strands of the state model curriculum. The citizenship test is defined by 18 learning outcomes, and the science test by 19 learning outcomes. (Contains three diagrams and eight tables.) (SLD)

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Fourth-grade Proficiency Tests: Information Guide

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Introduction

What are the Fourth-grade Proficiency Tests?

The purpose of the Fourth-grade Proficiency Tests is to measure a fourth-grade level of literacy and basic competency. In March 1995, fourth-grade students took the Fourth-grade Proficiency Tests in writing, reading, mathematics, and citizenship. Science will be added in March 1996.

The fourth-grade tests will be administered once annually, beginning the first Monday following March 15. There will be a make-up period for any students missing the regular administration of the test. Intervention in the fifth grade is required for any students not demonstrating a fourth-grade level of literacy and basic competency.

Overview of Proficiency Process

How are Ohio educators involved in the Fourth-grade proficiency test development process?

Both teachers and administrators are heavily involved in all aspects of the development of items for the Fourth-grade proficiency tests. The Ohio Department of Education (ODE) begins by asking school districts and many professional organizations for names of people they would like to recommend to serve on content committees. Included among the organizations are Ohio Education Association, Ohio Federation of Teachers, Ohio School Boards Association, Buckeye Association of School Administrators, Ohio Association of Elementary School Administrators, Ohio Association of Supervision and Curriculum Development, Ohio Association for the Education of Young Children, Ohio School Supervisors Association, Ohio Council for the Teaching of the Language Arts, Ohio Council of International Reading Association, Ohio Council of Teachers of Mathematics, and Science Education Council of Ohio. The names submitted are used to build committees that represent diversity in ethnicity, gender, geography, and size and kind of school districts. A committee of 25 is built for each content area with teachers representing half of the 25 selected for each group. This group of 25 is known as the content review committee in a specific test area.

What is the source of the learning outcomes?

The first job of each content review committee was to come together to discuss and eventually decide what the learning outcomes should be for that grade and that subject area. The source documents in writing, reading, mathematics, citizenship, and science were the State Board of Education adopted model courses of study. Specific learning outcomes are performance objectives at the tested grade level or below.

What process does an item go through to become a part of an operational form?

ODE must create a document, an invitation to bid, that lists and describes all activities and products involved in the scope of work that a contractor would have to perform. Potential contractors submit bids on how they would complete all activities and products required. ODE evaluates proposals to find the lowest and most responsive bid. The successful contractor then proposes test and item specifications to the content review committees which have specified learning outcomes.

The contractor next develops items that meet the approved specifications. Each item goes through a five-step process before it can appear in an operational form of the proficiency tests:

- Step 1—The Bias Review/Sensitivity committee looks over all materials to make sure materials do not disadvantage individuals or groups. Any changes the committee makes are made to all materials before going on to the second step. This sensitivity committee is made up of 18 people who represent Ohio's diverse population. The committee, which includes a teacher in each content area, looks at all content areas.

- Step 2—The content review committee (one in each of the fourth-grade test areas) also looks at all the materials in that content area and makes any changes that the group requires.

- Step 3— Items are tried out, or field-tested, in circumstances similar to those for operational testing, that is, on a similar population and at a similar time of year. Operational test forms for reading, mathematics, citizenship, and science will contain some embedded field-test items, so that successful new test items can be continually added to the item bank.

- Step 4—Field-tested items go back through Bias Review with information about the performance of the items in the field testing. Any changes the committee decides to make to items will necessitate field testing again. Each item is voted on by the committee.

- Step 5—Field-tested items go back through the specific content review committees with information about performance of items in the field testing. Any changes the committee decides to make to items will necessitate field testing again. Each item is voted on by the committee.

Only items that go through *all five steps* successfully are eligible to be included in the item bank and used in an operational form of the test or in the practice test.

How were items developed and chosen for inclusion in the practice test?

A half-length practice test is one of the products developed by the contractor. Items on the practice test have been through the five-step process described above and must reflect several factors:

- as many learning outcomes as possible
- as many item formats as possible
- the average difficulty of the item bank

Items appearing on the practice test will not be used on an operational form of the test.

How will teachers and students receive copies of the practice test?

Each fall, enough copies of the fourth-grade practice tests will be mailed to elementary school principals so that each Ohio fourth-grade student receives a copy. Copies of a separate booklet of instructions, answers, and the spread of learning outcomes represented in the practice test are sent in the same mailing. It is the same half-length practice test that is printed and mailed out each fall. Additional copies may be obtained by contacting the Assessment Center (614) 466-0223.

Administration of the Proficiency Tests

What do teachers need to share with students about the fourth-grade tests?

- Students will have a maximum of two and one-half hours to finish each test. It is expected that most students will be able to complete work on a test within approximately 75 minutes. At least one break will be included in the administration of the test. This break will occur approximately after the initial 35 minutes of the test.

- The tests will follow the same administration sequence as all other proficiency tests: first day, writing; second day, reading; third day, mathematics; fourth day, citizenship; and fifth day, science. Districts may decide whether to administer one test per day or administer multiple tests per day. The same sequence must be followed whether it is decided to administer a single test per day or multiple tests per day. A maximum of two and one-half hours must be allowed for each test.

- All work must be done in the test booklet. Students will be expected to show all work and write all answers in the test booklet. Any work that has been written may remain in the booklet; there is no need to erase the work.

- Each multiple-choice question has three response choices, only one of which is correct. There is no penalty for guessing. The three response choices for each multiple-choice item are plausible, in a logical order, and consistently worded. Items usually ask direct questions. An item could use the expression *choose the best answer* or could be worded negatively, but this rarely occurs. Response choices such as *None of the above* or *All of the above* are not used.

- Since frequently made mistakes are often used as response choices, students should be encouraged to check their answers. Students are encouraged to read all response choices before selecting one.

- Students may **not** use calculators, rulers, compasses, or protractors for the mathematics test. Students should be reminded not to bring to the test any other helpers or manipulatives. The student will be given only a #2 pencil.

- Students will **not** be permitted to use reference materials (such as print or electronic forms of dictionaries, thesauruses or spell-check software) or tools other than writing instruments on the test. Modifications in test format and/or test administration procedures will be made to

accommodate the needs of an individual student if such modifications are specified in the signed Individual Education Program (IEP).

- Charts, maps, and other materials in the classroom that could assist students with test items will be covered or removed during the test administration.
- The short-answer and extended-response items must be legible to be scored, but either print (manuscript) or cursive writing is permitted.
- All test material presented is well written and of interest to students.
- Reading and writing passages and test items avoid stereotyping, specific language, unfair representations, or other elements that might disadvantage any person or group on the basis of gender, race, religion, culture, or disability.
- To familiarize students with the types of questions found on this test, a half-length practice test is available.

Writing

What can students and teachers expect on the Fourth-grade Proficiency Test in Writing?

The Fourth-grade Proficiency Test in Writing is defined by nine learning outcomes. These learning outcomes, based on Ohio's *Model Competency-Based Language Arts Program*, were developed by committees made up of Ohio citizens (educators and business members) through a consensus-building process.

For the Fourth-grade Proficiency Test in Writing, the student will be given one topic or stimulus which will direct two writing activities, exercises A and B. Each exercise is a separate mode or purpose for writing. Each mode will be one of the following: a summary; a retelling; a fictional narrative; a personal experience narrative; an informational piece (a report); or a communication (letter, invitation, thank-you note, letter to the editor, directions, or journal).

The test administrator will lead students through a script which will incorporate the language of the writing process: prewriting, writing, revising, and editing. The prewriting stage will contain the topic or stimulus (e.g., an idea or scenario described by the test administrator, a picture, or a piece of literature). The prewriting introduction will serve for both writing activities. Students will be asked to complete a prewriting activity which will not be scored. The lack of a student response to the prewriting activity will not lower a student's score.

The script encourages the student to continue the writing process by editing and revising. With each writing activity an editing checklist will be included that reminds the students of required features of writing: follow a clear organizational pattern; check spelling and punctuation; and use a variety of words.

The directions for the writing activities will encourage focusing on a topic, using details that support the topic, and constructing an organized, natural response that flows and has a beginning, middle, and end. Students will write their response to the topic or stimulus in the test book. Although students are provided four pages for each writing activity, it is not necessary for students to use all pages provided. Topics have been developed so that no group of students will be at a subject-related disadvantage.

What are the fourth-grade learning outcomes in writing and what do they mean to students and teachers?

The learning outcomes define the proficiencies fourth-grade students are expected to possess and apply as a result of their learning experiences in kindergarten through February of the fourth-grade year. The nine outcomes are grouped into four strands:

- Content
- Organization
- Use of Language
- Writing Conventions

Content measures the student's ability to convey a message using supporting ideas and examples. *Organization* measures the student's ability to think logically and to present ideas clearly and effectively. *Use of Language* measures the student's ability to use expressive language appropriately, choosing words and phrases appropriate to a given purpose and a specific audience. *Writing Conventions* measures the student's ability to apply the mechanics of English to convey content successfully.

Each topic or stimulus (activity direction) will be constructed to elicit two of the following different purposes (modes) for writing. Students are encouraged to follow the instructions in terms of the mode or purpose for writing. The student's response may be any length but should be complete.

Summary—a piece of writing restating the topic by concisely listing the major idea(s). A summary does not list details. A summary is based on the topic. It does not add anything to the topic. A summary is written in the student's own words. Copying anything from the topic is not a summary.

Retelling—a piece of writing that restates the selection by giving the major points and supporting details in correct sequence. A retelling does not give any new details nor does a retelling create a new beginning, middle, or end. A retelling is written in the student's own words. Copying the selection is not a retelling.

Fictional Narrative—a piece of writing telling a story that is not true. The topic serves as the motivation for the writing.

Personal Experience Narrative—a piece of writing that tells a story based on the student's own experiences. The story may be true or not true. The topic serves as the motivation for the writing.

Informational—a piece of nonfiction writing that is a report. The topic serves as the motivation for the writing.

Communication:

Letter—a piece of writing in the form of a letter. The letter should be recognizable as a letter, i.e., a greeting, body, and closing are included. The topic serves as the motivation for the writing.

Invitation—a piece of writing in the form of a letter inviting someone to an event. The invitation may take the form of a letter or may take a structured approach, e.g., TO, WHERE, TIME, EVENT. If the invitation takes the form of a letter, the letter should be recognizable as a letter, i.e., a greeting, body, and closing are included. The topic serves as the motivation for the writing.

Thank-you Note—a piece of writing in the form of a letter thanking someone for something done for or given to the writer of the note. The thank-you note should be recognizable as a letter, i.e., a greeting, body, and closing are included. The topic serves as the motivation for the writing.

Letter to the Editor—a piece of writing in the form of a letter directed to the editor of a newspaper or magazine. The letter generally tries to persuade the editor to agree with the writer's point of view or informs the editor of an occurrence or information the writer believes the editor should know. The letter should be recognizable as a letter, i.e., a greeting, body, and closing are included. The topic serves as the motivation for the writing.

Directions—a piece of writing that explains how to do something, e.g., go somewhere, make something. The directions may be in paragraph form or given line by line. The topic serves as the motivation for the writing.

Journal—a piece of writing recounting the activities of a day, a month, or a period of years. The journal may be written in letter form or in paragraph form. The topic serves as the motivation for the writing.

Learning Outcomes

Given an assigned activity direction intended to elicit two of the preceding modes of writing, the student will use the writing process to make the intended message clear, as evidenced by the following outcomes:

STRAND I - CONTENT

1. **A response that stays on topic.**

2. **The use of details to support the topic.**

STRAND II - ORGANIZATION

3. **An organized and logical response that flows naturally and has a beginning, middle, and an end.**

STRAND III - USE OF LANGUAGE

4. **The use of a variety of words.**

5. **The use of a variety of sentence patterns.**

6. **A response that shows an awareness of word usage (vocabulary, homonyms, and words in context).**

STRAND IV - WRITING CONVENTIONS

7. **A response that shows an awareness of spelling patterns for commonly used words.**

8. **Legible writing in print or cursive.**

9. **The correct use of capital letters (beginning of sentences and for proper nouns) and end punctuation.**

How are the tests scored?

The scoring method used for the Fourth-grade Proficiency Test in Writing is called holistic scoring. Readers using this method consider the papers as a whole, using the individual characteristics of the rubric as a guide. They are looking for the integration of all four elements of good writing: content, organization, use of language, and writing conventions. Weaknesses in one area may be compensated for by strengths in another; however, high-scoring papers demonstrate strength in all four areas.

As writing samples are scored, a careful balance of these four categories is sought. Holistic scoring emphasizes the overall impression of the writing in keeping with the sense that "the whole is greater than the sum of its parts." The student's writing may contain errors in any of the four areas. However, the overall effect of the paper should not be limited by such errors.

The student's written responses to each writing activity are scored holistically by a reader trained specifically for this project. The scores for the two written responses from each student are then added together and reported to the school district. The actual papers themselves are not returned.

The rubric, or score-point description, adopted in the state of Ohio for evaluating fourth-grade student writing, is based on the nine learning outcomes listed previously and uses the numerical scale described below.

What is a rubric for holistic scoring?

The rubric is a *4-point* scale. This scale represents the different levels of writing proficiency demonstrated, based on the nine learning outcomes.

Scores are designed to be used in conjunction with illustrative rangefinder papers and are intended to describe characteristics of most papers at a particular score point. The aim is to determine the best fit; a paper at any given score point may not meet all characteristics.

Rubric

A *4-point* response focuses on the topic, clearly addresses the purpose (mode), and has ample supporting details. It has a logical structure that flows naturally with a beginning, a middle, and an end. It has a sense of wholeness. It has an effective use of language with a variety of words and sentence patterns. It shows an awareness of word usage and spelling patterns in commonly used words. It exhibits the use of capital letters at the beginning of sentences and for proper nouns. It contains correct end punctuation.

A *3-point* response is related to the topic and generally addresses the purpose (mode). It has adequate supporting details. It has a logical order with an apparent beginning, middle, and end, although some lapses may occur. It has word choices that are generally adequate and has sentences that are mostly complete. It shows an awareness of word usage and spelling patterns in commonly used words. It may have occasional word usage, spelling errors, and punctuation errors that do not interfere with the message. It has correct capitalization (at the beginning of sentences and for proper nouns).

A *2-point* response attempts to address the purpose (mode). It demonstrates an awareness of the topic but may include extraneous or loosely related material. It includes some supporting details. It shows an attempt at organizing the paper around a beginning, middle, and end. It has limited vocabulary and has word usage and spelling errors that interfere with the message. It shows knowledge of capitalization at the beginning of sentences and for proper nouns. It shows knowledge of the conventions of punctuation.

A *1-point* response may or may not attempt to address the purpose (mode). It offers few details and is only slightly related to the topic. It exhibits little or no evidence of an organizational structure; the beginning, middle, or end of the response may be poorly defined or nonexistent. It has limited or inappropriate vocabulary that obscures meaning. It has gross errors in sentence structure, word usage, and spelling that impede communication. It has frequent and blatant errors in basic punctuation and in capitalization at the beginning of sentences and for proper nouns.

An *N/S* (Not Scorable) is assigned if there is no response or if the response is unreadable, off topic, off task, illegible, or written in a language other than English.

Who are the readers?

Readers are employed by an independent scoring company that meets the rigorous standards set by the state for scoring of the fourth-grade proficiency tests. Prospective readers must hold a bachelor's degree, be able to write a satisfactory paper, provide references and/or proof of experience as a reader, and undergo a personal interview. In addition, readers must participate in training sessions to familiarize themselves with the expectations of student writing as defined in the rubric and as illustrated in rangefinder papers. That is, they read, discuss, and score Ohio rangefinder papers written on the writing activity they will be scoring. Readers for this project must qualify by scoring sets of unmarked papers with at least 80% agreement with the decisions made by the Ohio rangefinder committee. Calibration packets are used to check the consistency of readers throughout the scoring process. Readers are dismissed if they cannot maintain a degree of consistency on a daily basis. Table leaders carefully supervise readers as the scoring progresses.

Who are the Ohio rangefinder committee members, and what are the rangefinder papers?

Ohio educators, including classroom teachers and representatives from the Ohio Department of Education, make up the rangefinder committee that reads student papers from the fourth-grade field test and chooses papers that represent each level of writing proficiency as defined in the rubric. Prior to scoring of the fourth-grade proficiency tests, the committee meets with representatives of the scoring company to read, score, and discuss student papers so that the contractor representatives have a clear idea of how Ohio

teachers expect the papers to be scored. The rangefinder papers chosen are used to train readers and set standards to guide their scoring. Members of the rangefinder committee also travel to the scoring site to observe both the training of readers and the actual scoring of student writing.

What are some specific administration tips for the writing test?

- The test administrator, who could be the classroom teacher, will lead students through a script which will emphasize the language of the writing process—prewriting, writing, revising, and editing. The test administrator will read aloud the topic or stimulus. While students are working, the test administrator will answer only questions about procedures.

- A checklist for students to use to evaluate their writing is included in the script and the test booklet. The checklist is based on the 4-point rubric.

- At the prewriting stage, students will use the test administrator's statements and comments in the script to focus their attention on the activity. Students will be provided with ample space for a prewriting activity in the test booklet. The prewriting activity will not be scored. Students who choose not to respond to the prewriting activity will not be penalized.

- Students will use pencil (#2) and will be informed that erasing and crossing out and other editing changes are acceptable. The writing sample must be legible to be scored, but either print (manuscript) or cursive writing is permitted.

Facts from the Fourth-grade Proficiency *Field Test*

Test items based on the writing learning outcomes were field tested in April 1994. While the number of students responding to each writing activity was limited, some general observations regarding student achievement can be made. Scored examples of the writing activities on the practice test are included in the *Resource Manual for Teachers of Fourth Grade*.

- Students performed best on exercises designed to elicit narrative writing.

- Student performance was lowest on exercises designed to elicit informational writing.

For more information on the writing learning outcomes, see the *Ohio Model Competency-Based Language Arts Program.*

Reading

What can students expect on the Fourth-grade Proficiency Test in Reading?

The Fourth-grade Proficiency Test in Reading is defined by twenty learning outcomes. These learning outcomes, based on Ohio's *Model Competency-Based Language Arts Program*, were developed by committees made up of Ohio citizens (educators and business members) through a consensus-building process. These learning outcomes have been identified from four strands in the State Board adopted model curriculum.

The items on the reading test are based on fiction, poetry, and nonfiction reading selections. Each form of the proficiency tests includes test items based on the selections and some embedded field-test items. There are five field-test items embedded in the reading test, making a total of 35 items, only 30 of which are counted to obtain the students' reading scores. These field-test items give ODE the potential to continue adding to the item bank for future test forms.

Each form will contain multiple-choice items, short-answer items, and extended-response items. The number of each type of item in a form will be determined by the reading selections in the form.

Table I
Reading Item Distributions

Strands	Multiple Choice	Short Answer	Extended Response	Totals
Fiction/Poetry				
Constructing Meaning (4)	2 – 5	1 – 2	0 – 1	3 – 8
Examining/Extending Meaning (6)	4 – 12	1 – 3	0 – 2	5 – 16
Nonfiction				
Constructing Meaning (4)	2 – 5	1 – 2	0 – 1	3 – 8
Examining/Extending Meaning (6)	4 – 12	1 – 3	0 – 2	5 – 16
Total number of items based on selection	20-24	5-7	2	30

( ) = Number of learning outcomes

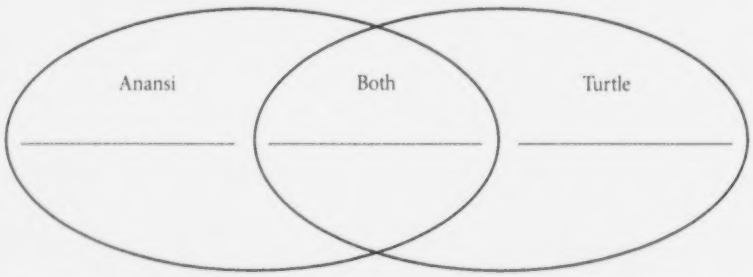
Multiple-choice items are used whenever a single, concise answer to a question is possible. Multiple-choice questions included on the Fourth-grade Proficiency Test in Reading emphasize critical thinking rather than factual recall. There is no penalty for guessing. Each reading selection will have at least one short-answer or one extended-response item.

Open-ended items that require either a short phrase/sentence or an extended response give students the opportunity to demonstrate their ability to organize ideas and respond to what they have read. In a reading test, it is important to have items that most directly and accurately reflect how readers use such processes as organizing ideas, analyzing and responding to text, and integrating text information with background knowledge.

Some of the open-ended items make use of graphic organizers of the type currently used in classrooms and textbooks. For example, a *Venn diagram* may be used to compare two characters:

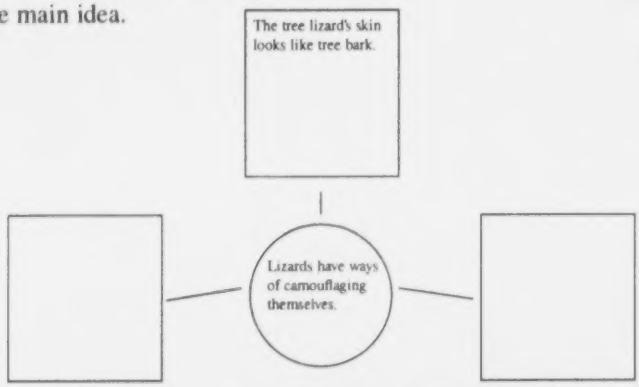
* Fill in the diagram with a word to describe Anansi, and word to describe Turtle, and a word to describe them both. Use a word only once. Choose from:

1. tricky
2. greedy
3. kind
4. upset



A *wheel-type graphic* may be used to distinguish between major ideas and supporting ideas in an informational passage:

* The main idea from the selection is in the circle. In the boxes write two more supporting details that tell about the main idea.



A simple *two-column chart* may be used to compare two elements in a passage:

* How were the tricks played by Anansi and Turtle different? Fill in the chart to show how the tricks were different.

Anansi's Trick	Turtle's Trick

When items make use of these types of graphic organizers, instructions are spelled out clearly and often examples are given to show how to fill in the diagram or chart. This ensures that students who have had less experience than others with these types of devices will have an equal opportunity to succeed in responding to them.

***Note:** The sample items used here to illustrate these types of graphic organizers are **not** included in the item bank.

What types of reading selections can students expect on the Fourth-grade Proficiency Test in Reading?

Reading selections that appear in the test come from published sources and may include poetry, essays, short stories, novel/book excerpts, plays, pamphlets, instruction booklets, and newspaper and magazine articles. These fiction, poetry, and nonfiction selections cover a wide range of subject matter, are of appropriate difficulty for fourth-grade students, and include a variety of topics. Selection length ranges up to 750 words. Every test form contains 2-3 fiction/poetry selections and 2-3 nonfiction selections. The selections together total about 1200-1500 words. Selection length will help to determine the number of questions for that selection. For example, a 200-word selection might be accompanied by five questions and a 600-word selection by eight questions.

What are the fourth-grade learning outcomes in reading and what do they mean to students and teachers?

The learning outcomes define the proficiencies fourth-grade students are expected to possess and apply as a result of their learning experiences in kindergarten through February of the fourth-grade year. The twenty outcomes are grouped into four strands:

- Constructing Meaning: Fiction
- Examining/Extending Meaning: Fiction
- Constructing Meaning: Nonfiction
- Examining/Extending Meaning: Nonfiction

Constructing Meaning refers to students' ability to understand the overall meaning of what they read; for example, students are asked to summarize an article or to retell a story. *Examining/Extending Meaning* refers to students' ability to interpret what they read and to go beyond the text; for example, students are asked to analyze or to respond to a text, or to compare and contrast aspects of a text.

The learning outcomes and related information about test content are provided on the following pages. The information included in this guide applies to most test items: however, the descriptions may not cover all items that could be used on the tests.

Outcomes 1-10 are designed for fiction and poetry materials. Examples of fiction materials include excerpts from novels and short stories. Outcomes 11-20 are designed for nonfiction materials. Examples of nonfiction materials include passages from textbooks, newspapers, and magazine articles.

STRAND I - CONSTRUCTING MEANING WITH FICTION SELECTIONS

Given a fiction/poetry text to read silently, students will demonstrate an understanding of language and elements of fiction/poetry by responding to items in which they:

1. **Summarize the text.**

2. **Use graphic aids (for example, a table or graph) or illustrations to locate or interpret information.**

3. **Demonstrate an understanding of text by retelling the story or poem, in writing, in own words.**

4. **Identify and interpret vocabulary (words, phrases, or expressions) critical to the meaning of the text.**

STRAND II - EXAMINING/EXTENDING MEANING WITH FICTION SELECTIONS

Given a fiction/poetry text to read silently, students will demonstrate an understanding of language and elements of fiction/poetry by responding to items in which they:

5. **Analyze the text, examining, for example, actions of characters, problem/solution, plot, or point of view.**

6. **Infer from the text.**

7. **Compare and/or contrast elements such as characters, setting, or events.**

8. **Respond to the text.**

9. **Choose materials related to purposes, as evidenced in part by the capacity to**

   a) **choose or identify reference resources to locate specific information;**
   b) **select fiction and nonfiction materials in response to a topic or theme;**
   c) **choose appropriate resources and materials to solve problems and make decisions.**

10. **Demonstrate an understanding of text by predicting outcomes and actions.**

STRAND III - CONSTRUCTING MEANING WITH NONFICTION SELECTIONS

Given nonfiction text to read silently, students will demonstrate an understanding of language and elements of nonfiction by responding to items in which they:

11. **Summarize the text.**

12. **Use graphic aids (for example, a table or graph) or illustrations to locate or interpret information.**

13. **Demonstrate an understanding of text by retelling the information, in writing, in own words.**

14. **Identify and interpret vocabulary (words, phrases, or expressions) critical to the meaning of the text.**

STRAND IV - EXAMINING/EXTENDING MEANING WITH NONFICTION SELECTIONS

Given nonfiction text to read silently, students will demonstrate an understanding of language and the elements of nonfiction by responding to items in which they:

15. **Discern major ideas and supporting ideas.**

16. **Analyze the text, examining, for example, comparison and contrast, cause and effect, or fact and opinion.**

17. **Infer from the text.**

18. **Respond to the text.**

19. **Choose materials related to purposes, as evidenced in part by the capacity to**

    a) **choose or identify reference resources to locate specific information;**
    b) **select fiction and nonfiction materials in response to a topic or theme;**
    c) **choose appropriate resources and materials to solve problems and make decisions.**

20. **Demonstrate an understanding of text by predicting outcomes and actions.**

What is some additional information concerning the learning outcomes?

- Students are expected to identify a statement that reflects the entire content of a text when summarizing the text.
- A retelling is not a summary. A retelling is a restatement of the important events of a story, poem, or informational piece in the student's own words. A good response may draw on the language of the original text but should not copy it. A student who uses the characters, plot, setting, etc. of a selection but tells an entirely different story will receive no credit.
- When students infer from the text, they grasp an important idea not directly stated in the text.
- Students respond to the text by relating the text to personal experience or feelings.
- In nonfiction text, students focus on major and supporting ideas and the relationships between or among them.

How are the tests scored?

Each multiple-choice item on the test is worth one point; each short-answer item is worth two points; and each extended-response item is worth four points.

Conventions of writing (sentence structure, word choice, usage, grammar, spelling, and mechanics) will not affect the scoring of short-answer or extended-response items unless there is interference with the clear communication of ideas.

Short-answer items will be scored on a *2-point* scale based on these general scoring guidelines:

A *2-point* response is complete and appropriate. It demonstrates a thorough understanding of the reading selection. It indicates logical reasoning and conclusions. It is accurate, relevant, comprehensive, and detailed.

A *1-point* response is partially appropriate. It contains minor flaws in reasoning or neglects to address some aspect of the item or question. It is mostly accurate and relevant but lacks comprehensiveness. It demonstrates an incomplete understanding of the reading selection or inability to make coherent meaning from the text.

A *0* is assigned if the response indicates no understanding of the reading selection or item.

Extended-response items will be scored on a *4-point* scale based on these general scoring guidelines:

A *4-point* response provides extensive evidence of the kind of interpretation called for in the item or question. The response is well-organized, elaborate, and thorough. It demonstrates a complete understanding of the whole work as well as how parts blend to form the whole. It is relevant, comprehensive, and detailed, demonstrating a thorough understanding of the reading selection. It thoroughly addresses the important elements of the question. It contains logical reasoning and communicates effectively and clearly.

A *3-point* response provides evidence that an essential interpretation has been made. It is thoughtful and reasonably accurate. It indicates an understanding of the concept or item, communicates adequately, and generally reaches reasonable conclusions. It contains some combination of the following flaws: minor flaws in reasoning or interpretation, failure to address some aspect of the item, or the omission of some detail.

A *2-point* response is mostly accurate and relevant. It contains some combination of the following flaws: incomplete evidence of interpretation, unsubstantiated statements made about the text, an incomplete understanding of the concept or item, lack of comprehensiveness, faulty reasoning, unclear communication.

A *1-point* response provides little evidence of interpretation. It is unorganized and incomplete. It exhibits decoding rather than reading. It demonstrates a partial understanding of the item but is sketchy and unclear. It indicates some effort beyond restating the item. It contains some combination of the following flaws: little understanding of the concept or item, failure to address most aspects of the item, or inability to make coherent meaning from text.

A *0* is assigned if the response shows no understanding of reading selection or item.

What are some specific administration tips for the reading test?

- Some reading selections are preceded by a boxed headnote that gives information essential to the reader. The reading practice test contains an example. Be sure students understand they are to read this headnote carefully as part of the selection.

- Some selections contain a minimal number of words in a language other than English. These are accompanied by a "Word Bank," which gives the English equivalent of non-English words.

Facts from the Fourth-grade Proficiency *Field Test*

Test items based on the reading learning outcomes were field tested in April 1994. While the number of students responding to each test item was limited, some general observations regarding student achievement can be made. The summary below is based upon review of student performance on multiple-choice items only. Scored examples of short-answer and extended-response items found on the practice test are included in the *Resource Manual for Teachers of Fourth Grade*.

- Student performance was highest on multiple-choice items measuring outcomes 1, 2, 5, 10, 14, 19, and 20.

- Student performance was lowest on multiple-choice items measuring outcomes 9 and 17.

For more information on the reading learning outcomes, see the Ohio *Model Competency-Based Language Arts Program.*

Mathematics

What can students expect on the Fourth-grade Proficiency Test in Mathematics?

The Fourth-grade Proficiency Test in Mathematics is defined by twenty-five learning outcomes. These learning outcomes, based on Ohio's *Model Competency-Based Mathematics Program*, were developed by committees made up of Ohio citizens (educators and business members) through a consensus-building process. These learning outcomes have been identified from the eight strands in the State Board adopted model curriculum.

Each form of the proficiency tests includes some embedded field test items. There are 5 field test items embedded in the mathematics test, making a total of 45 items, only 40 of which are counted to obtain the students' mathematics scores. These field test items give ODE the potential to continue adding to the item bank for future test forms.

Each form will contain 30 multiple-choice items, 8 short-answer items, and 2 extended-response items. Altogether, the 30 multiple-choice items are worth 30 points, the 8 short-answer items are worth 16 points, and the 2 extended-response items are worth 8 points, making a total of 54 points. In all, the multiple-choice items account for about 55% of the total score; short-answer items, 30%; and extended-response items, 15%.

Table II
Mathematics Test Distributions

Type	Number of Items	Total Points	Total Percent
Multiple Choice	30	30	55
Short Answer	8	16	30
Extended Response	2	8	15
TOTAL	40	54	100

Short-answer items might ask students to carry out a calculation and write an answer; to examine a situation and describe why one alternative or another was correct; to measure or draw a figure; to complete a table; or to provide a numerical, verbal, or visual representation of their solution.

Extended-response items require students to construct their own responses and to demonstrate problem solving, mathematical reasoning, and application of concepts and skills. Extended-response items require students to communicate their understanding of the problem situation, verify and interpret results with respect to the problem, and justify their answers and solution processes. Each strand has at least one short-answer or one extended-response item. Since credit for answers is usually based on demonstrated understanding of concepts, students should be encouraged always to explain their answers, when asked to do so. The more understanding that a student demonstrates, the more credit may be assigned.

Table III
Mathematics Item Distributions

Strands	Multiple Choice	Short Answer	Extended Response	Totals
I. Patterns, Relations, and Functions (2)	1-5	1-2	0-1	2-8
II. Problem-Solving Strategies (3)	1-6	1-2	0-1	2-9
III. Numbers and Number Relations (6)	4-10	1-4	0-1	5-15
IV. Geometry (3)	2-6	1-2	0-1	3-9
V. Algebra (2)	1-5	1-2	0-1	2-8
VI. Measurement (5)	2-8	1-2	0-1	3-11
VII. Estimation and Mental Computation (2)	1-5	1-2	0-1	2-8
VIII. Data Analysis and Probability (2)	1-5	1-2	0-1	2-8
Total Number of Items	30	8	2	40
Total Number of Points	30	16	8	54

( ) = number of learning outcomes

A fourth-grade level of literacy and competency requires understanding of concepts, recall of basic mathematical facts, performance of mathematical procedures, and application of concepts and skills to problem-solving situations. Test items assess the learning outcomes at one of three levels of understanding. These levels are described below.

Conceptual Understanding (approximately 50% of the items on the test)

Items in this category test the student's ability to recognize examples and counter examples, use various representations of concepts, apply facts and definitions, compare and contrast related concepts and principles, judge the characteristics of solutions, and interpret charts and tables.

Knowledge and Skills (approximately 25% of the items on the test)

Items in this category test the student's knowledge of important basic terms, facts, methods, procedures, and skills. This includes the ability to recall important definitions and relationships; read graphs and tables; and perform rounding, ordering, and estimating operations.

Application and Problem Solving (approximately 25% of the items on the test)

Items in this category test the student's ability to use reasoning in new situations. This includes the ability to translate between pictorial and mathematical representations of a problem; determine the sufficiency and consistency of data; use strategies and data to solve problems; and use spatial, inductive, and deductive reasoning.

What are the fourth-grade learning outcomes in mathematics and what do they mean to students and teachers?

The learning outcomes define the proficiencies fourth-grade students are expected to possess and apply as a result of their learning experiences in kindergarten through February of the fourth-grade year. The twenty-five outcomes are grouped into eight strands:

- patterns, relations, and functions
- problem-solving strategies
- numbers and number relations
- geometry

- algebra
- measurement
- estimation and mental computation
- data analysis and probability

The learning outcomes and related information about test content are provided on the following pages. The information included in this guide applies to most test items: however, the descriptions may not cover all items that could be used on the tests.

STRAND I - PATTERNS, RELATIONS, AND FUNCTIONS

1. **Sort or identify objects on multiple attributes (e.g., size, shape, and shading).**

   This outcome includes sorting or identifying illustrations of real-life objects or geometric shapes based upon attributes and explaining reasoning used. Test items will use illustrations of real-life objects and geometric shapes that are familiar to fourth-grade students.

2. **Use patterns to make generalizations and predictions by**

   a) **determining a rule and identifying missing numbers in a sequence;**
   b) **determining a rule and identifying missing numbers in a table of number pairs;**
   c) **identifying missing elements in a pattern and justifying their inclusion; and**
   d) **determining a rule and identifying missing numbers in a sequence of numbers or a table of number pairs related by a combination of addition, subtraction, multiplication, or division.**

   Students need to be able to recognize, describe, and extend a variety of patterns and to use patterns to make generalizations and predictions. Test items require the student to continue a pattern by identifying or supplying a missing element(s) and/or describing a rule. Patterns are presented as a sequence of numbers or shapes, a table of number pairs, or an illustration of patterns found in nature.

STRAND II - PROBLEM-SOLVING STRATEGIES

3. **Select appropriate notation and methods for symbolizing a problem situation, translate real-life situations into conventional symbols of mathematics, and represent operations using models, conventional symbols, and words.**

This outcome emphasizes communicating mathematically and applying mathematics productively. Students need to be able to represent problem-solving situations using appropriate pictures, graphs, number phrases or sentences, mathematical symbols, and words. Problem situations or operations are often presented in worded format.

4. **Identify needed information to solve a problem.**

Students should examine problems presented to determine whether sufficient information has been given, what information has been included that is not needed, and what additional information may be needed. Problems are often in worded format and may be accompanied by an illustration, table, or chart.

5. **Explain or illustrate whether a solution is correct.**

This outcome focuses on determining whether a solution is correct and explaining why or why not a given solution is correct. Students may justify their solutions, thinking process, and conjectures in a variety of ways: pictures, graphs, number phrases or sentences, and/or words.

STRAND III - NUMBERS AND NUMBER RELATIONS

6. **Decompose, combine, order, and compare numbers.**

The term "decompose" refers to identifying various sums or products equal to the given number; for example, 7 is the same as $3 + 4$ or $2 + 5$ and 18 can be written as 3×6, 2×9, or $2 \times 3 \times 3$. Test items involve whole numbers only. The symbols $<$, $>$, $\leq$, $\geq$, and $=$ may be used to order and compare numbers.

7. **Illustrate or identify fractional parts of whole objects or set of objects and like fractions greater than one, and add and subtract like fractions with illustrations and symbols.**

Students should be familiar with multiple meanings or models of fractions including a fraction as part of a region, a fraction as part of a group of separate objects, and a fraction as a linear model such as a number line or ruler. Common fractions are used in test items and may be accompanied by illustrations. Addition and subtraction involve fractions with like denominators. Students should be familiar with equivalent fractions.

8. **Add, subtract, multiply, and divide whole numbers and explain, illustrate, or select thinking strategies for making computations.**

This outcome includes understanding the underlying concepts and relationships of basic operations and demonstrating skill with the paper-and-pencil algorithms.

Table IV
Parameters for Computations involving Whole Numbers

	Minimum	Maximum
Addition	3 two-digit numbers	3 three-digit numbers
Subtraction	2 two-digit numbers	2 four-digit numbers
Multiplication	one-digit multiplier	two-digit multiplier
	two-digit multiplicand	four-digit multiplicand
Division	one-digit divisor	two-digit divisor
	two-digit dividend	four-digit dividend

Some test items involving division require students to interpret and apply remainders.

9. **Order fractions using symbols as well as the terms "at least" and "at most."**

Developing an awareness of the relative size of fractions and ordering fractions are essential to the understanding and application of fraction concepts and operations. Test items may require the use of the symbols <, >, or = for comparing and ordering fractions. When appropriate, illustrations accompany items.

10. **Represent whole number value by**

a) **applying place value ideas,**
b) **translating between words and symbols in naming whole numbers.**

Relating counting, grouping, and place value will develop understanding of and appropriate skill in using our numeration system. Test items require fluency with numerals through the millions and the application of place value concepts in problem situations.

11. **Add and subtract decimals.**

Students encounter decimals naturally in many situations—data, measurements, and situations involving money. Students should be able to add and subtract decimals expressed as tenths or hundredths. Computation items are presented in either vertical or horizontal format, and some items include combinations of whole numbers and decimals as well as decimals used to represent money amounts.

STRAND IV - GEOMETRY

12. **Apply congruence, symmetry, paths, simple closed curves, and the ideas of interior and exterior.**

    These geometric concepts develop through visualizing, drawing, and comparing figures or shapes. Students should develop a facility with the language of geometry through explorations using models and experiences in sorting, classifying, drawing, and sketching. Test items use only plane figures (two-dimensional).

13. **Recognize parallel, intersecting, and perpendicular lines, and right angles in geometric figures.**

    Students should be able to identify, describe, compare, and classify lines and angles. Classification of angles is in reference to right angles, i.e., smaller than a right angle or larger than a right angle. Test items use illustrations of real-life objects or geometric figures.

14. **Determine properties of two-dimensional figures and compare shapes according to their characterizing properties, identify two-dimensional shapes on a picture of a three-dimensional object, and compare three-dimensional objects describing similarities and differences using appropriate standard or non-standard language.**

    The focus for this outcome is identifying properties of figures and comparing and classifying figures according to their properties. Test items use illustrations of two- or three-dimensional geometric figures, as well as real-life objects, that are familiar to fourth-grade students.

STRAND V - ALGEBRA

15. **Symbolize a keying sequence on a calculator and predict the display.**

    Test items require students to supply missing elements (digits or operation symbols) in a keying sequence or to determine what number will be displayed as the result of a keying sequence. Each digit or operation symbol is represented as a separate step in the sequence. Test items are accompanied by an illustration of a calculator.

16. **Model a problem situation using a number phrase/sentence and/or letters, understand the use of letters and symbols in statements such as $4b = 12$ or $3c = 15$ and find the value for a letter or symbol if the value for the other letter or symbol is given, and recognize the use of variables to generalize arithmetic statements applying the concept of odd and even numbers.**

This outcome emphasizes recognizing and/or using variables in problem-solving situations and mathematical sentences as statements. Only one variable is used with each equation.

STRAND VI - MEASUREMENT

17. **Apply the use of tools to measure lengths, using centimeters and inches, including recognizing the positions of whole numbers and fractions on a number line.**

This outcome tests the ability to use tools to measure lengths in either the U.S. standard or metric units. Pictorial representations of measuring devices appear adjacent to the object that is to be measured when appropriate.

18. **Apply the counting of collections of coins and bills (which could include one, five, and ten dollar bills) in a buying situation.**

The counting of collections of coins and bills is emphasized in this outcome. Pictorial representation of money (coins and bills) is used when appropriate.

19. **Illustrate the approximate size of units of length, capacity, and weight; choose an appropriate unit to measure lengths, capacities, and weights in U.S. standard and metric units; and relate the number of units that measure an object to the size of the unit as well as to the size of the object.**

In the estimation of measures, all answer choices are stated in the same system of measurement.

20. **Determine perimeters and areas of simple straight line figures and regions without using formulas.**

The focus is on the determination of perimeters and areas of simple straight line figures and regions without using formulas. Grids are generally provided to help students determine the perimeters and areas of figures or regions.

21. **Use mental, paper-and-pencil, and physical strategies to determine time elapsed.**

This outcome tests the ability to determine time elapsed using both digital and dial (analog) time-pieces. Pictorial representations of clock faces and digital time-pieces are used when appropriate.

STRAND VII - ESTIMATION AND MENTAL COMPUTATION

22. **Apply concept of place value in making estimates in addition and subtraction using front-end digits.**

    This outcome includes the understanding of front-end estimation for both addition and subtraction. The front-end strategy provides a means of arriving at an estimate quickly and easily by using the leading, or front-end digits, to obtain an initial estimate and making adjustments to refine the estimate. Items will emphasize the initial estimate and not require adjustments be made. Use of the strategy will require an application of place value.

23. **Round numbers and use multiples of ten to estimate sums, differences, and products and discuss whether estimates are greater than or less than an exact sum or difference.**

    Items testing this outcome may require the student to round numbers and use multiples of ten to estimate sums, differences, and products; some items may have the student determine whether an estimate is greater than or less than a given sum.

STRAND VIII - DATA ANALYSIS AND PROBABILITY

24. **Make or use a table to record and sort information (in a problem-solving setting using simple and complex patterns in nature, art, or poetry as setting) and make identifications, comparisons, and predictions from tables, picture graphs, bar graphs, and labeled picture maps.**

    This outcome tests the student's ability to make or use a table or graph to record and sort information; interpret the information given in a table, chart, or graph; and make predictions based on this information.

25. **Find simple experimental probabilities and identify events that are sure to happen, events sure not to happen, and those we cannot be sure about.**

    Students should be able to apply their knowledge and understanding of probability to determine simple experimental probabilities and to differentiate among events that are sure to happen, events that are sure not to happen, and events that no one can be sure about. When appropriate, probabilities are accompanied by a pictorial representation.

What is some additional information concerning the learning outcomes?

Because the learning outcomes were taken from the State Board adopted curriculum which is used in Ohio classrooms, the use of manipulatives has been emphasized throughout the test. While manipulatives are not given to the students during the test administration, pictorial representations appear when appropriate.

How are the tests scored?

Each multiple-choice item on the test is worth one point; each short-answer item is worth two points; and each extended-response item is worth four points. Altogether, the thirty multiple-choice items are worth 30 points; the eight short-answer items are worth 16 points; and the two extended-response items are worth 8 points. The total test score is 54 points. (See Table II on page 23.)

Conventions of writing (sentence structure, word choice, usage, grammar, spelling, and mechanics) will not affect the scoring of short-answer or extended-response items, unless there is interference with the clear communication of ideas.

Short-answer items will be scored on a *2-point* scale based on these general guidelines:

> A *2-point* response shows complete understanding of the concept or task, logical reasoning and conclusions, and correct set up and/or computations.
>
> A *1-point* response contains minor flaws in reasoning, neglects to address some aspect of the task, or contains a computational error.
>
> A *0* is assigned if the response indicates no mathematical understanding of the concept or task.

Extended-response items will be scored on a *4-point* scale based on these general guidelines:

A *4-point* response contains an effective solution. It shows complete understanding of the concept or task and thoroughly addresses the points relevant to the solution. It contains logical reasoning and valid conclusions, communicates effectively and clearly through writing and/or diagrams, and includes adequate and correct computations and/or set up when required. It may go beyond the requirements of the item.

A *3-point* response contains minor flaws. Although it indicates an understanding of the concept or item, communicates adequately through writing and/or diagrams, and generally reaches reasonable conclusions, it contains minor flaws in reasoning and/or computation, or neglects to address some aspect of the item.

A *2-point* response indicates gaps in understanding and/or execution. It contains some combination of the following flaws: an incomplete understanding of the concept or item, failure to address some points relevant to the solution, faulty reasoning, weak conclusions, unclear communication in writing and/or diagrams, or a poor understanding of relevant mathematical procedures or concepts.

A *1-point* response indicates some effort beyond restating the item or copying given data. It contains some combination of the following flaws: little understanding of the concept or item, failure to address most aspects of the item or solution, major flaws in reasoning that led to invalid conclusions, a definite lack of understanding of relevant mathematical procedures or concepts, or it omits significant parts of the item and solution or response.

A *0* is assigned if the response indicates no mathematical understanding of the concept or item.

Facts from the Fourth-grade Proficiency *Field Test*

Test items based on the mathematics learning outcomes were field tested in April 1994. While the number of students responding to each test item was limited, some general observations regarding student achievement can be made. The summary below is based upon review of student performance on multiple-choice items only. Scored examples of short-answer and extended-response items found on the practice test are included in the *Resource Manual for Teachers of Fourth Grade*.

- Student performance was highest on multiple-choice items measuring outcomes 1, 6, 7, 10, 17, and 24.

- Student performance was lowest on multiple-choice items measuring outcomes 3, 4, 5, 8, 13, 22, and 25.

For more information on the mathematics learning outcomes, see the Ohio *Model Competency-Based Mathematics Program.*

Citizenship

What can students expect on the Fourth-grade Proficiency Test in Citizenship?

The Fourth-grade Proficiency Test in Citizenship is defined by eighteen learning outcomes. These learning outcomes, based on Ohio's *Model Competency-Based Social Studies Program*, were developed by a committee of Ohio citizens (educators and business members) through a consensus-building process. These learning outcomes have been identified from six strands in the State Board adopted model curriculum.

Each form of the proficiency tests includes some embedded field test items. There are five field test items embedded in the citizenship test, making a total of 45 items, only 40 of which are counted to obtain the students' citizenship scores. These field test items give ODE the potential to continue adding to the item bank for future test forms.

Each form contains 30 multiple-choice items, 8 short-answer items, and 2 extended-response items. Altogether, the 30 multiple-choice items are worth 30 points, the 8 short-answer items are worth 16 points, and the 2 extended-response items are worth 8 points, making a total of 54 points. In all, the multiple-choice items account for about 55% of the total score; short-answer items, 30%; and extended-response items, 15%.

Table V
Citizenship Test Distributions

Type	Number of Items	Total Points	Total Percent
Multiple Choice	30	30	55
Short Answer	8	16	30
Extended Response	2	8	15
TOTAL	40	54	100

Short-answer items typically ask students to explain a conclusion, provide examples, complete a chart, interpret information, or provide a rationale for an answer they have chosen. Extended-response items might ask students to interpret information from a 3-5 line paragraph on a specific topic, reach a conclusion and justify that conclusion, or provide examples. Since credit for answers is usually based on demonstrated understanding of concepts, students should be encouraged always to explain their answers, when asked to do so. The more understanding that a student demonstrates, the more credit may be assigned.

Table VI
Citizenship Item Distributions

Strands	Multiple Choice	Short Answer	Extended Response	Totals
I. American Heritage (3)	4-8	1-2	0-1	5-11
II. People in Societies (3)	4-5	1-2	0-1	5-8
III. World Interactions (3)	4-8	1-2	0-1	5-11
IV. Decision Making (3) and Resources	4-8	1-2	0-1	5-11
V. Democratic Processes (3)	4-5	1-2	0-1	5-8
VI. Citizenship Rights and Responsibilities (3)	4-5	1-2	0-1	5-8
Total Number of Items	30	8	2	40
Total Number of Points	30	16	8	54

( ) = number of learning outcomes

Each strand has at least one short-answer or one extended-response item.

What are the fourth-grade learning outcomes in citizenship and what do they mean to students and teachers?

The learning outcomes define the proficiencies that fourth-grade students are expected to possess and apply as a result of their learning experiences in kindergarten through February of the fourth-grade year. The eighteen learning outcomes are grouped into six strands:

American Heritage
People in Societies
World Interactions
Resource Allocation (*Decision Making and Resources*)
Democratic Processes
Citizenship Rights and Responsibilities

The learning outcomes and related information about test content are provided below. The information included in this guide applies to most test items; however, the descriptions might not cover all items that could be used on the tests.

STRAND 1 - AMERICAN HERITAGE

Items in the American Heritage strand ask questions related to the student's understanding of chronology. *Specific chronological events are provided as part of the test items.* Items in this strand also focus on the use of sources of information about historical subjects. Students do not need extensive prior knowledge about state, national, or world historical events to answer items in this strand.

1. **Demonstrate knowledge of and ability to think about the relationship among events by:**

   (a) identifying sequence of events in history;
   (b) grouping events by broad historical eras on a time line;
   (c) recognizing that change occurs in history; or
   (d) identifying cause-and-effect relationships.

   Items addressing this learning outcome refer to the significance of historical events in the context of other events and various time periods. The items can refer to a graphic time line. Students could be asked to examine a time line to locate needed information or they could be asked to indicate the placement of historical development on a time line. Time lines use A.D. dates or express time as a number of "years ago" (e.g., 1000 years ago).

   The ability to identify the sequence of events, as called for in *1a*, is important for identifying possible cause-and-effect relationships in history. Students could be asked to examine a brief narrative or time line and determine where in the sequence a particular event occurred (first, second, or third). They could also be asked to identify an event that occurred at a particular time, based upon information provided in the item.

When grouping events by broad historical eras on a time line, students have to examine specific information and/or the dates provided about events. *The historical eras and the specific events are provided as part of the test items.* Items for *1b* could ask the students to identify in which of several eras on the time line an event falls. Students could be asked which of several events falls within a given historical era.

Items for *1c* call for students to recognize change in history and to consider how historical developments have changed over time. Students could be provided with a listing of historical developments and asked to identify which development took place an approximate number of years ago. Students could also be asked to identify a development on a time line that caused a given change to occur, or to indicate how long the development took place.

Cause-and-effect relationships are the basis for items for *1d.* Students are asked to identify these relationships by using information found on a time line or in a narrative. Students could be asked to explain what a particular cause-and-effect relationship is or to select a given relationship that is supported by the information provided.

2. **Identify and use sources of information about a given topic in the history of Ohio and the United States.**

Students need to know how to obtain historical information from a variety of sources. Reference materials could include dictionaries, almanacs, encyclopedias, magazines, pamphlets, atlases, maps, or globes, as well as primary sources. Primary source information could include diary entries, letters, eyewitness newspaper accounts, or other documents prepared by persons participating in a particular event. Items could also refer to artifacts and to places such as museums and historical sites.

Students could be asked what type or title of reference material would be an appropriate source for a given topic. Students could also be presented with a particular type of reference material and asked what type of information could be found in the reference. The items for this learning outcome could present information about a topic in written or graphic form and ask students to use the information in answering a question.

3. **Relate major events and individuals in state history to time periods in the history of the nation and the world.**

Events in Ohio do not occur in isolation from developments in the nation and the world. This learning outcome requires students to examine specific information or the dates provided about historical developments in the state. Students are provided with time lines or brief descriptions.

The items could ask the students to identify in which national or world era a particular event falls. *The historical eras, specific events, and names of people are provided as part of the item material.* Students could also be asked to explain the meaning of information demonstrating a given historical relationship. Major developments in Ohio history between 1500 and 1900 A.D. will be the basis for items under this learning outcome. Extensive prior knowledge about events and individuals is not needed to answer the items for this outcome.

STRAND II - PEOPLE IN SOCIETIES

Items in the People in Societies strand ask questions pertaining to cultural groups in Ohio. The phrase *cultural groups* refers to a number of individuals sharing unique characteristics (e.g., race, ethnicity, national origin, and religion). The items ask for identification, explanation, and comparison of cultural groups. Students should be able to associate immigrant groups with their country or continent of origin.

4. **Identify the various kinds of cultural groups that have lived or live in Ohio.**

Students should be able to apply basic ideas and principles learned from the study of specific cultural groups (as chosen by their teachers) to groups described in test items. These groups include racial groups such as African Americans, ethnic groups such as Native Americans, nationalities such as Polish, and religious groups such as the Amish. Items addressing this learning outcome could ask students to describe cultural groups in Ohio or to recognize what major groups have lived or live in the state.

5. **Identify or explain how various cultural groups have participated in the state's development.**

Ohio has become the state it is because of the participation of people from many backgrounds. Many groups have affected Ohio in a variety of ways. Waves of migrations after the Civil War and both world wars have helped make African Americans the largest racial minority group in the state. It is not uncommon for cities in Ohio to have ethnic communities. Migrant workers, some of whom are Hispanic, have been crucial to the agricultural development of the state. People of German ancestry have helped to establish colleges and universities. These are but a few examples of how cultural groups have affected the development of Ohio.

Items addressing this learning outcome could provide students with examples of contributions by members of various groups and ask the name of the field in which a specific contribution was made. The items could identify a group and ask how the group impacted Ohio's development.

6. **Identify or compare the customs, traditions, and needs of Ohio's various cultural groups.**

   There is a great variety in the customs, traditions, and needs of Ohio's cultural groups. This is reflected in such things as the foods, celebrations, festivals, and religious practices of people.

   Items addressing this learning outcome deal with how various cultural groups uniquely express the common needs of all people. Students could be asked to identify customs, traditions, and needs of groups or to compare the similarities and differences among groups. Students could also be asked to compare the customs, traditions, and needs of groups with their own experiences.

STRAND III - WORLD INTERACTIONS

Items in the World Interactions strand ask questions that refer to maps and to the meaning of location on the Earth. Maps of the world use the Robinson or other equal-area projection. All maps are clear, have necessary information, and avoid extraneous details.

7. **Demonstrate map skills by:**

   (a) **identifying various major reference points on the Earth;**
   (b) **locating major landforms and bodies of water; or**
   (c) **using a number/letter grid system to locate places on a map, a map key to understand map symbols, a linear scale to measure distances on a map, and a direction indicator.**

   Students need to utilize a variety of basic map skills. Identification and interpretation of information on maps are important capabilities for citizens.

   Items for *7a* require students to identify major reference points or lines on the Earth. They use maps of hemispheres or the world to show the continents and oceans. The items could ask students to locate any of several major reference points or lines, including the North and South Poles, the Equator, the Prime Meridian, and the Arctic and Antarctic Circles.

   Items for *7b* use maps to show Ohio, the United States, or the world. They include major land masses and water bodies. On maps of Ohio, students should be able to locate or identify Lake Erie and the Ohio River. On maps of the United States, students should be able to locate or identify the Great Lakes, Mississippi River, Appalachian Mountains, and Rocky Mountains. On maps of the world, students should be able to locate or identify the continents and oceans.

Items for *7c* require students to do one of several things. Some maps could include a number/letter grid system. Students could be asked to locate a particular grid block and identify what is located within that grid block or to identify the grid block containing a specific location. Some items could refer to a map key and ask students to interpret or use a particular symbol on a map. Other items could ask students to use a map scale to estimate distance. Items could use a direction indicator to ask students the direction one point is from another or what is located in a particular direction from a given point.

8. **Use maps and diagrams as a source of information to:**

   (a) **recognize continents by their outlines and major physical features;**
   (b) **recognize characteristics of major landforms and bodies of water;**
   (c) **describe physical differences between places; or**
   (d) **explain the influence of the natural environment on the settlement of Ohio and on changes in population patterns, transportation, and land use.**

This learning outcome focuses on the association of maps as sources of information with actual physical and human features or activities on the Earth's surfaces. It also calls for identification and interpretation of information found on maps and diagrams.

Items for *8a* require students to examine maps that show outlines of the continents. The maps could contain representations of major physical features such as mountain ranges, rivers, seas, and lakes. Students could be asked to identify which continent they are being shown or to select a map showing a given continent.

Items for *8b* use maps or diagrams to show the unique characteristics of various landforms and bodies of water. Students could be asked to identify a specific landform or body of water. Students could be asked to identify a particular characteristic of the given landform or body of water (e.g., elevation, shape, direction). Major landforms include mountains, hills, plateaus, valleys, and plains. Major bodies of water include rivers, lakes, and oceans.

Students need to examine maps or diagrams and use map keys to address items for *8c*. They could be asked to indicate a physical feature that is unique to a particular area. They could also be asked to indicate how physical features differ from place to place.

Items for *8d* use maps or documents to illustrate how climate and terrain have affected population patterns, transportation routes, or land use in Ohio and other states. Students could be given an example of climate or terrain and asked to indicate the effect of those conditions on some activity. Students could be given an example of an activity affected by climate or terrain and asked what aspects of climate or terrain have affected change.

9. **Identify or describe the location of Ohio in relation to other states, to regions of the United States, and to major physical features of North America.**

   This learning outcome focuses on students' understanding of relative location. The use of appropriate maps should enable students to draw conclusions about the location of Ohio.

   Students could be asked what direction Ohio is from a given state, region, or physical feature identified on a map. Students could be asked to indicate what direction a given state, region, or physical feature is from Ohio. Students could be asked to determine which state, region, or physical feature is closest to or farthest from Ohio. Students could also be asked to indicate states, regions, or physical features along a line between two locations.

STRAND IV - RESOURCE ALLOCATION (DECISION MAKING AND RESOURCES)

Items in the Resource Allocation strand ask questions that examine basic economic concepts as they relate to people's everyday lives.

10. **Identify the factors of production (land, labor, capital, and entrepreneurship) needed to produce various goods and services.**

    What is involved in the production of the goods and services that people use? This learning outcome requires students to identify the four basic factors of production — land, labor, capital, and entrepreneurship. *Land* refers to productive resources occurring in nature such as water, soil, trees, and minerals. *Labor* consists of the talents, training, and skills of people that contribute to the production of goods and services. *Capital* refers to productive resources made by past human efforts and includes resources such as buildings, machinery, vehicles, and tools. *Entrepreneurship* consists of the activities of profit-seeking decision makers who make decisions about which economic activities to undertake and how they should be undertaken.

    Students should be able to identify specific factors of production involved in the examples of production provided by the test items. Students could be given an example and asked to identify the factor of production involved. Students could be given a factor of production and asked to identify an example of that factor. Items could refer to pictures or diagrams as well as to written information.

11. **Name the resources needed to produce various goods and services, classify each resource by the factors of production, or suggest alternative uses for those factors.**

This learning outcome uses examples of production to examine the use of resources. It stresses applications of the factors of production in specific situations. Students also need to appreciate that any given resource can be used in a variety of ways.

Students could be presented with common goods and services (e.g., a glass) and asked to identify particular resources needed to produce them (e.g., sand). Students could be given a productive resource (e.g., aluminum) and asked to identify a good or service (e.g., cans) that could be produced with the resource.

Some items could ask students to examine a resource used in the production of a good or a service and to identify the factor of production involved. Students could be asked to identify examples of a given factor of production in a short explanation about how a good or service is produced.

Factors of production can be used in many different ways. Sand can be used to produce glass, sandpaper, or concrete. Another variation on this learning outcome could ask students to suggest alternative uses for various factors of production being used in particular ways.

12. Classify various economic activities as examples of production or consumption.

People help to produce and consume goods and services. Production is the act of combining land, labor, capital, and entrepreneurship to make goods and services. Consumption refers to the purchase or use of goods and services.

Students should be able to classify or categorize examples of production (e.g., a worker on an assembly line) and consumption (e.g., pumping gasoline at a self-service pump into a car). Students could be asked to examine an activity and to indicate if the activity is an example of production or an example of consumption.

STRAND V - DEMOCRATIC PROCESSES

Items in the Democratic Processes strand ask questions about how state and local governments operate. These items concern the functions of the various branches of government and the purposes of government.

13. Identify the function of each branch of state government.

There are three branches of state government: legislative, executive, and judicial. The primary function of the legislative branch is to make laws. Items addressing this learning outcome could use other expressions such as *state legislature* or *Ohio General Assembly* as well as *legislative*

branch. The primary function of the executive branch is to enforce the laws of the state. Items addressing this learning outcome could use other terms such as *governor* or *executive agencies* as well as *executive branch.* The primary function of the judicial branch is to interpret the meaning of the laws and to apply the laws in specific cases. Items addressing this learning outcome could use other expressions such as *state courts, judges,* or *state court system* instead of *judicial branch.*

Students could be given a branch of the government and asked to identify its function. Students could be given a function and asked to identify the branch that exercises that function.

14. Identify the purposes of state government.

State government refers to the government of a state of the United States of America. State government serves several broad purposes. Those purposes include:

a. protecting the health and safety of citizens (e.g., state highway patrol, use of National Guard in emergencies);
b. providing and maintaining public services through the collection of taxes (e.g., road construction, wildlife preserves);
c. providing for a system of justice (e.g., state civil and criminal courts);
d. protecting the rights of individual citizens (e.g., rights guaranteed in the state constitution and laws); and
e. promoting the common welfare (e.g., providing funds for schools, trade missions to other nations).

The items for this learning outcome could refer to the written or graphic material based upon the purposes listed above. Because some governmental activities may serve more than one purpose at the same time, students should always consider the primary purpose of government being served in any example provided as part of a test item. These items might use other wording to describe the purposes of state government.

Students could be given a purpose and asked to identify or describe an example of governmental activity appropriate to the purpose. Students could be given an example of governmental activity and asked to identify the purpose being served. Students could also be given information about governmental activities and asked to explain or interpret the information.

15. Identify or explain the purposes of local government.

Local government serves several broad purposes. Those purposes include:

a. protecting the health and safety of citizens (e.g., fire department, police, snow removal);
b. providing and maintaining public services through the collection of taxes (e.g., parks, libraries, public records);
c. providing for a system of justice (e.g., local courts);
d. protecting the rights of individual citizens (e.g., fair housing ordinances, zoning); and
e. promoting the common welfare (e.g., sponsoring day care facilities, providing public parking).

The items for this learning outcome could refer to written or graphic material based upon the purposes listed above. Because some governmental activities may serve more than one purpose at the same time, students should always consider the primary purpose of a government service in any example provided as a part of a test item. The items might use other wording to describe the purposes of local government.

Students could be given a purpose and asked to identify or describe an example of governmental activity appropriate to the purpose. Students could be given an example of governmental activity and asked to identify the purpose being served or to explain how the activity is meant to achieve a given purpose. Students could also be given information about governmental activities and asked to explain or interpret the information.

STRAND VI - CITIZENSHIP RIGHTS AND RESPONSIBILITIES

Fourth-grade students live in a variety of settings such as school, church, clubs, and community. They follow rules, attend meetings, help to make decisions, and work with other children to accomplish tasks. These are civic activities that help to prepare students for their role as adult citizens. Items in the Citizenship Rights and Responsibilities strand examine activities that are a part of people's civic lives in a democratic republic.

16. Differentiate between statements of fact and opinion found in information about public issues and policies.

Citizens need information to help make decisions concerning public issues. One skill they must possess is the ability to differentiate between factual information and information that expresses an opinion.

Items addressing this learning outcome use statements like those found in local sources of news such as TV, radio, newspapers, and magazines.

Students could be asked to examine materials and indicate whether a particular statement is a factual statement or a statement of opinion. Students could be asked to explain why a particular statement is factual or is a statement of opinion. They could also be asked to examine a series of statements and to select one that is a statement of fact or opinion.

17. **Identify and assess the possibilities of group decision making, cooperative activity, and personal involvement in the community.**

The life of a citizen in a democracy revolves around making decisions and interacting with other citizens. The continued involvement of citizens is critical in a democratic republic.

Items addressing this learning outcome explore the impact of local public issues and decisions (e.g., vandalism, school rules, and recycling) on groups to which the student belongs. The items also explore the student's personal responsibility in working with others.

Students could be asked to identify or explain how decisions address local issues. Students could be asked to identify examples of cooperation and explain the results of people working together. Students could also be asked to identify and explain how individuals can get involved in community activities to address a particular issue.

18. **Identify the elements of rules relating to fair play.**

Fairness is a basic element in our society. It enhances the ability of people to respect and to get along with each other and is a characteristic of good citizenship. Taking turns, sharing, and letting everyone participate are examples of rules that students use that address the idea of fairness.

Items addressing this learning outcome explore applications of rules relating to fair play. Students could be given a series of situations and asked to identify which situation is unfair. Students could also be asked to identify ways to address a given situation fairly. Students could be asked to determine the fairness of a rule or which of several rules are fair.

What is some additional information concerning the learning outcomes?

Items addressing any learning outcome could refer to written or graphic material(s).

How are the tests scored?

Each of the multiple choice items in the test is worth one point; each of the short-answer items is worth two points; and each extended-response item is worth four points. Altogether, the thirty multiple-choice

items are worth 30 points; the eight short-answer items are worth 16 points; and the two extended-response items are worth 8 points. The total test score is 54 points. (See Table V on page 35.)

Conventions of writing (sentence structure, word choice, usage, grammar, spelling, and mechanics) will not affect the scoring of short-answer or extended-response items, unless there is interference with the clear communication of ideas.

Short-answer items will be scored on a *2-point* scale based on these general guidelines:

> A *2-point* response is complete and appropriate. It demonstrates a thorough understanding of the concept or item. It indicates logical reasoning and conclusions. It is accurate, relevant, comprehensive, and detailed.
>
> A *1-point* response is partially appropriate. It is mostly accurate and relevant but lacks comprehensiveness and demonstrates an incomplete understanding of the concept or item. It contains minor flaws in reasoning or neglects to address some aspect of the concept or item.
>
> A *0* is assigned if the response indicates no understanding of the concept or item.

Extended-response items will be scored on a *4-point* scale based on these general guidelines:

> A *4-point* response provides evidence of extensive interpretation and thoroughly addresses the points relevant to the item. It is well-organized, elaborate, and thorough. It is relevant, comprehensive, detailed, and demonstrates a thorough understanding of the concept or item. It contains logical reasoning and communicates effectively and clearly. It thoroughly addresses the important elements of the item.
>
> A *3-point* response provides evidence that an essential interpretation has been made. It is thoughtful and reasonably accurate. It indicates an understanding of the concept or item, communicates adequately, and generally reaches reasonable conclusions. It contains some combination of the following flaws: minor flaws in reasoning, neglects to address some aspect of the concept or item, or some details might be missing.
>
> A *2-point* response is mostly accurate and relevant. It contains some combination of the following flaws: incomplete evidence of interpretation, unsubstantiated statements made about the text, an incomplete understanding of the concept or item, lacks comprehensiveness, faulty reasoning, or unclear communication.

A *1-point* response demonstrates a partial understanding of the concept or item but is sketchy and unclear. It indicates some effort beyond restating the item. It contains some combination of the following flaws: little evidence of interpretation, unorganized and incomplete, failure to address most aspects of the concept or item, major flaws in reasoning that led to invalid conclusions, a definite lack of understanding of the concept or item, or demonstrates no coherent meaning from text.

A *0* is assigned if the response indicates no understanding of the concept or item.

Facts from the Fourth-Grade Proficiency *Field Test*

Test items based on the citizenship learning outcomes were field tested in April 1994. While the number of students responding to each test was limited, some general observations regarding student achievement can be made. The summary below is based upon review of student performance on multiple-choice items only. Scored examples of short-answer and extended-response items found on the practice test are included in the *Resource Manual for Teachers of Fourth Grade*.

- Student performance was highest on multiple-choice items measuring outcomes 7, 8, 17, and 18.
- Student performance was lowest on multiple-choice items measuring outcomes 10, 12, and 13.

For more information on citizenship learning outcomes, see the Ohio *Model Competency-Based Social Studies Program.*

Science

What can students expect on the Fourth-grade Proficiency Test in Science?

The Fourth-grade Proficiency Test in Science is defined by nineteen learning outcomes. These learning outcomes, based on Ohio's *Model Competency-Based Science Program*, were developed by committees made up of Ohio citizens (educators and business members) through a consensus-building process. These learning outcomes have been identified from the four strands in the State Board adopted model curriculum.

Each form of the proficiency tests includes some embedded field test items. There are 5 field test items embedded in the science test, making a total of 45 items, only 40 of which are counted to obtain the students' science scores. These field test items give ODE the potential to continue adding to the item bank for future test forms.

Each form will contain 30 multiple-choice items, 8 short-answer items, and 2 extended-response items. Altogether, the 30 multiple-choice items are worth 30 points, the 8 short-answer items are worth 16 points, and the 2 extended-response items are worth 8 points, making a total of 54 points. In all, the multiple-choice items account for about 55% of the total score; short-answer items, 30%; and extended-response items, 15%.

Table VII
Science Test Distributions

Type	Number of Items	Total Points	Total Percent
Multiple Choice	30	30	55
Short Answer	8	16	30
Extended Response	2	8	15
TOTAL	40	54	100

Short-answer items might ask students to provide an explanation for an answer they have chosen; interpret information from a chart, graph, or drawing; explain simple cause-and-effect relationships; provide examples; or explain a conclusion.

Extended-response items might ask students to evaluate the effectiveness of a procedure; make predictions and explain the reasons for those predictions; make and justify conclusions; describe natural processes or interactions among the components of a biological or physical system; or create and use classification systems.

Each strand has at least one short-answer or one extended-response item. Since credit for answers is usually based on demonstrated understanding of concepts, students should be encouraged always to explain their answers, when asked to do so. The more understanding that a student demonstrates, the more credit may be assigned.

Table VIII
Science Item Distributions

Strands	Multiple Choice	Short Answer	Extended Response	Totals
I. Nature of Science (9)	11-18	1-3	0-1	12-22
II. Physical Science (3)	3-7	1-3	0-1	4-11
III. Earth and Space Science (3)	3-7	1-3	0-1	4-11
IV. Life Science (4)	4-9	1-3	0-1	5-13
Total Number of Items	30	8	2	40
Total Number of Points	30	16	8	54

( ) = number of learning outcomes

A fourth-grade level of competency in science requires an understanding of scientific processes and inquiry, and application of knowledge, skills, and concepts to problem-solving situations. Test items assess the learning outcomes at one of three levels of science processes, as described on the following page.

Acquiring Scientific Knowledge (approximately 35% of the items on the test)

Items in this category test students' proficiency at recalling, observing, collecting, and recording data and information from a variety of sources and representations and performing operations and making measurements to obtain data. This includes the ability to take measurements from instruments; read graphs and tables; and recall fundamental facts, concepts, or relationships.

Processing Scientific Knowledge (approximately 40% of the items on the test)

Items in this category test students' proficiency at organizing, interpreting, manipulating, verifying, summarizing, and reformulating observations and data. This includes the ability to interpret data or information from text, graphs, tables, or drawings; recognize relationships, structure, and function among objects or organisms; use simple identification keys or classification systems; and recognize procedures appropriate to a given investigation.

Extending Scientific Knowledge (approximately 25% of the items on the test)

Items in this category test students' proficiency at evaluating, applying, formulating, transforming, and communicating ideas and hypotheses in various contexts. This includes the ability to propose solutions or conclusions based on data from graphs, tables or drawings; determine and/or explain the effectiveness of a procedure; and use spatial, inductive, or deductive reasoning in problem solving.

What are the fourth-grade learning outcomes in science, and what do they mean to students and teachers?

The learning outcomes define the proficiencies that fourth-grade students are expected to possess and apply as a result of their learning experiences in kindergarten through February of the fourth-grade year. The nineteen learning outcomes are grouped into four strands:

- Nature of science
- Physical science
- Earth and space science
- Life science

The learning outcomes and related information about test content are provided below. The information included in this guide applies to most test items; however, the descriptions might not cover all items that could be used on the tests.

STRAND I - NATURE OF SCIENCE

Built into this science test is an assessment of students' abilities and thinking habits in investigating science ideas. The nine outcomes in this strand overlap traditional science units and each other and should therefore be reinforced throughout the science curriculum—that is, should be taught in context—at every grade level.

1. **Create and/or use categories to organize a set of objects, organisms, or phenomena.**

   This outcome tests students' ability to group objects according to shared characteristics or attributes (structure, function, shape, state of matter, member of same food group, etc.); identify or create a classification system from observing objects that are already grouped or that can be grouped; and suggest objects that would belong to given groups or to groups created by the student. Test items will use illustrations of real-life objects or organisms that are familiar to fourth-grade students.

   Students should be familiar with the process of sorting based on observable characteristics, and with explaining their reasons for creating categories. Memorized knowledge about specific classifications (such as mammals) is not nearly as important as a student's ability to recognize or *think through* why something belongs (or doesn't belong) in a certain group.

2. **Select instruments, make observations, and/or organize observations of an event, object, or organism.**

   Students should be able to select appropriate instruments (to make observations or perform a task); read or interpret data from graphs or tables; take measurements from representations of objects and/or instruments; and organize data, events, or observations into graphs, tables, or sequences. Test items will use illustrations of real-life instruments, objects, or organisms, and will show appropriate scales or units as needed.

   Students should be able to use their natural senses, alone or in combination with representations of instruments or measuring devices, to describe or organize things *factually*—without opinion or inference. Because observations are often used to communicate information about events and

objects to someone who has not observed that event or object, students should understand the importance of specific, factual descriptions or quantifications in observations. For instance, observations that an object "is black, about the size of a spinning (three-dimensional) penny, and can scratch a steel knife" communicate specific facts; the inference, "It's a rock" does not.

In selecting or making readings from instruments, students should have the natural scientific habit of examining an instrument's attributes: what it can do or measure, by what scale or units measurements are made, and so on. Similarly, in organizing observations or data, students should have the natural scientific habit of examining relationships between observations and sequence or time.

3. **Identify and/or compare the mass, dimensions, and volume of familiar objects in standard and/or nonstandard units.**

Students should be familiar enough with measurement concepts and basic SI units (Système International, or "metric" units) to do the following:

- recognize which SI units are appropriate for measuring mass, length, and volume;
- understand the decimal arrangement of SI units, some general relationships in scaling (a kilometer is larger than a meter, a centimeter is smaller than a meter, etc.), and some specific relationships between units (1 m = 100 cm; 1 km = 1000 m; etc.);
- make identifications or comparisons between measured objects as to lightest, heaviest, largest, smallest;
- use measurements given for two- and three-dimensional objects to determine a size relationship between those objects; for instance, if a sheet of material that is 1 cm wide and 1 cm high weighs 10 g, a sheet of the same material that is 2 cm wide and 2 cm high will weigh 40 g.

Students should have familiarity with measurement and with various standard or nonstandard units through having measured things themselves using a variety of measurement systems. Students should be able to use and interpret representations of objects and measurements, and in doing so should focus on the measurements given, not on a visual impression of size.

4. **Use a simple key to distinguish between objects.**

This outcome asks students to use a simple identification key (flow chart, dichotomous key, key in table or chart format) to distinguish between objects. This can mean using a key to identify which one of a set of objects can be identified by name or as belonging to a particular group; using a key or flow chart to separate large groups of objects into smaller groups; or analyzing a key to determine what characteristic *always* distinguishes one group or object from another. Dichotomous keys have two divisions or choices at each step and are typically based on an "either-or" classification system—either something has a particular characteristic or it doesn't.

The use of a dichotomous key relies on the student's ability to make clear observations and follow a logical sequence. Students should know how to proceed through a dichotomous key step-by-step, from the beginning, to identify a single unknown object or organism. Students should also be able to go to an object or organism identified in the key, and proceed "backward" thoroughly, step-by-step, to gather or identify all distinguishing characteristics of an object or organism. Important to such processes are practice in following written directions and in reading keys such as those found in many plant and animal "field guide" series.

Any illustrations in test items will *clearly* display all relevant key characteristics needed to distinguish groups or objects from one another.

5. **Analyze a series of events and/or simple daily or seasonal cycles and predict the next likely occurrence in the sequence.**

"Series of events" and "simple daily or seasonal cycles" include such things as phases of the moon; daily and seasonal orientation of the sun; daily cycles, seasonal cycles, or life cycles of plants and/or animals; or motion of gears. Students should be able to identify and/or explain simple patterns and relationships from graphs, charts, or drawings and predict the next likely occurrence in a pattern or sequence of events.

6. **Evaluate a simple procedure to carry out an exploration.**

This outcome requires students to identify which of several possible procedures should be used to explore or answer a particular question; identify which of several possible actions to take to gather information; evaluate whether a procedure or test will yield valid, "fair," or accurate results; and identify what information could be gained from an exploration. The outcome focuses on several aspects of scientific methodology—in particular, information gathering, performing experiments, interpreting the results, and drawing conclusions. Students should be able to identify a poor set-up or uncontrolled variables that could invalidate test results.

Students should be aware that there are generally several different ways to investigate something in science; they should also be used to thinking up possible methods of investigation, focusing on procedures that are logical and safe, and discussing their reasons for using or not using a particular method.

7. **Identify and/or discuss the selection of resources and tools used for exploring scientific phenomena.**

"Used for exploring scientific phenomena" is interpreted broadly to mean "used for a particular science process or with a particular desired result." The focus is on identifying resources and tools that would be appropriate to use *given the stated conditions*. For instance, if a desired result is to build an outdoor storage container that would keep seeds from sprouting, the container would have to be waterproof.

Selecting instruments and tools relies on students' abilities to make accurate observations and think logically about the task they are doing. Students should learn these principles through classroom activities that involve methods the students design or modify themselves.

8. **Evaluate observations and measurements made by other persons.**

Students should be able to evaluate the correctness or accuracy of simple observations or measurements; evaluate which, if any, conclusions can be drawn from data (that is, what conclusion, if any, is supported by the data); distinguish observations from inferences; and make and/or explain conclusions from data, measurements, or observations.

Inferences may be assumptions or reasonable conclusions drawn from observations, but they are not actual observations, and students should understand the difference. For instance, from a picture of five children running, observations could be made about the number of children and whether they were running in the same direction. Any statements about the *reasons* for the children running would be inferences.

Students should be used to comparing observations made by themselves and others to see if they make sense and are logical and accurate. People learn when they compare their learning to a new situation and figure out what any differences mean. Students should also be able to use observations and data in explaining their responses to short-answer and extended-response items.

9. **Demonstrate an understanding of safe use of materials and/or devices in science activities.**

This outcome focuses on identifying appropriate basic safety measures for certain situations or when dealing with certain materials and/or devices; identifying possible dangers to safety; and

identifying which senses (sight, smell, hearing, taste, touch) are appropriate for certain situations. Safety measures and topics/issues addressed include the following: power tools and electricity; laboratory and general safety procedures and precautions; presence or need of adult supervision or consultation; and handling of unknown plants, animals, dry substances, or solutions. See Appendix C in Ohio's *Model Competency-Based Science Program* for references to specific safety publications and guidelines.

Students should know the limits and rules of acceptable behavior in an activity; they should also be used to discussing safety as part of any activity, and should know they are to keep their teacher informed of things that go wrong in science activities.

STRAND II - PHYSICAL SCIENCE

Commonly thought of as physics and chemistry, physical science in this strand is limited to physical principles that can be observed and explored without complicated instrumentation or theories.

10. Explain the operation of a simple mechanical device.

"Simple mechanical devices" are simple, one-function machines that are reasonably familiar to fourth-grade students or that can be illustrated clearly. Students should be familiar enough with the six basic simple machines (lever, wedge, pulley, wheel and axle, inclined plane, and screw) to recognize them in real-world devices; recognize or explain how simple mechanical devices work (forces, motions, distances involved); and recognize how such a device can be used to reduce effort or force.

Students should understand that simple machines do not reduce work, but they commonly make an action less effort for people. Students should also know that the principle "you don't get something for nothing" applies to simple machines: when a machine is used and the effort gets easier, something else (like speed, or the distance of the effort) is sacrificed.

11. Identify characteristics of a simple physical change.

Students should be able to identify characteristics or examples of a simple physical change—that is, a change in the size, shape (configuration), or state of matter of a substance, without its producing or becoming a new substance. Students should also be able to distinguish between changes that are physical only and changes that are chemical as well as physical; describe the energy flow or force that can cause a physical change; and identify properties of the different

states of matter (gas, liquid, solid) that indicate a physical change. Items will employ real-world examples of physical changes (evaporation, condensation, melting, change in volume due to temperature, etc.).

12. **Explain and/or predict the motion of objects and/or describe the effects of some objects on other objects.**

Students should have a basic understanding of the concept of inertia; the relationship between mass, force, and inertia; gravity; friction, physical characteristics that are associated with causing or reducing friction, and the effect of friction on motion; magnetism; air pressure; and related forces or concepts. It is important that students *not* retain misconceptions about forces or concepts (e.g., the misconception that "since a nickel is heavier than a penny, gravity will make it fall faster"). Items will use real-world examples of objects with whose motions students are familiar.

Among the fundamental concepts students should understand are that things move only when something moves them; they keep moving until something stops them; the harder something is pushed, the faster it goes; and the more massive something is, the harder it is to move. Students who can best apply those concepts are those who have observed many moving things and investigated why they moved and how they may have been stopped.

STRAND III - EARTH AND SPACE SCIENCE

The earth science strand focuses primarily on fundamental concepts in geology and meteorology, exploring effects that are observable to students as well as observations and inferences made from years of collected evidence.

13. **Make predictions about the weather from observed conditions and weather maps.**

Students should be able to read and understand weather maps using keys, and make predictions from those maps or from stated conditions (times, temperatures, etc.). Students should have an understanding of the general west-to-east movement of weather in the continental U.S.; the association of storms, precipitation, or cloudy skies with colliding warm and cold fronts; the effect of air temperatures in clouds and below clouds on what form cloud precipitation will take; the association of high-pressure systems with clear skies; and the relationship between latitude and general temperature or weather patterns.

Students should be able to read maps and weather reports commonly found in daily newspapers;

make observations and predictions based on weather maps and on consistently observed phenomena; check predictions made by meteorologists; and identify the likely reasons for certain predictions.

14. Identify and/or describe the relationship between human activity and the environment.

This outcome tests students' ability to identify or describe the relationship between human activity and the environment, in terms of pollution (air, soil, water), conservation of resources (including plant and animal species), erosion, and agricultural activities; and identify or describe the physical qualities or characteristics of a particular environment that would make it suitable or unsuitable for various human activities (e.g., farming, mining).

Students should understand that human activity can have certain effects on the environment, just as the characteristics of an environment can have certain effects or limits on human activity. There are advantages and disadvantages to any activity, and students should be able to identify or discuss these from multiple viewpoints.

15. Identify evidence and show examples of changes in the earth's surface.

Students should be able to identify evidence of changes in the earth's surface from analyzing "before and after" illustrations of the earth's surface; from analyzing descriptions of events that would cause erosion, deposition, change in position, or other changes; or from analyzing the fossil record. Students should also be able to provide examples of changes in the earth's surface and explain the likely causes of such changes—action by wind, water, glaciers, gravity, and plant or animal activity.

Students should be able to observe and identify the effects of weathering and geological activity in their immediate world (buildings, sidewalks, playgrounds) as well as in the reports of events such as storms, floods, or earthquakes. The focus at this level should be on what something was like before the event and what it is like as a result of the event, based on students' own observations or on their analysis of other people's observations.

STRAND IV - LIFE SCIENCE

This strand emphasizes life science concepts that can be directly observed or explored by students, while minimizing the need to acquire specific terminology.

16. Demonstrate an understanding of the basic needs of living things.

Items will test students' understanding of a living organism's need for a source of food or energy, water, gases to take in, and an environment that will allow the organism to survive (protection, light, and temperature may be factors in such an environment). Students should be able to identify how a certain characteristic or behavior helps an organism meet its basic needs, or identify what basic need is being met by a characteristic or behavior; distinguish absolutely necessary conditions for growth or survival from conditions that aren't necessary; and identify how or why certain conditions can prevent organisms from surviving.

Students should be able to identify or discuss how to keep something alive, taking into account conditions as well as resources needed; students who have experiences in growing things or in keeping something alive will be able to draw on those experiences.

17. Identify ways in which organisms react to changing environments.

This outcome includes ways in which organisms react to major environmental changes at a population level; ways in which organisms react to changing environments at the individual level; changing environments that are daily or seasonal and regular (e.g., temperature, food availability); and changing environments that are not regular. Students should be able to identify which ways organisms react to such changes and the purpose that such reactions serve; and ways that organisms have to meet their basic needs when a changing environment stresses the organism.

Students should have familiarity with how plants and animals change as seasons or conditions change; the kinds of environmental stresses that can affect organisms and the ways organisms can respond physically or behaviorally to these stresses; and what advantages or disadvantages organisms get out of such responses.

18. Distinguish between living and nonliving things and provide justification for these distinctions.

Students should recognize characteristics that can identify a thing as living (the ability to grow and change, the ability to react to its environment, the need for food or another source of energy, taking in gases for respiration, the ability to reproduce, being made up of cells); characteristics that identify a thing as nonliving; characteristics of living things that nonliving things can show;

and characteristics that would distinguish an object as having once been living or come from a living thing. Students should understand that many nonliving things can show several characteristics of living things, but cannot show them all.

Students who have had practice in deciding and justifying whether or not something is alive will best be able to identify or explain characteristics of life cumulatively. Students should be familiar with constructing sets of "life characteristics" and testing those characteristics across known or unknown examples, and vice versa.

19. **Analyze and/or evaluate various nutritional plans for humans.**

Students should be able to read and analyze *Nutrition Facts* labels and ingredient lists for food items, and tell whether a food item is relatively high or low in the various nutrients—protein, carbohydrate (sugars and starches), fat, vitamins, minerals. Students should also be able to identify from labels or ingredient lists whether a food item is well-balanced according to the official Food Guide Pyramid (of the U.S. Department of Agriculture); analyze meal menus or nutritional plans and recognize what nutrients the plan may be lacking, be low in, or have too much of; understand the importance of balance in a diet; and understand how people's level of activity influences their calorie needs.

Students should also understand that there is no "one best diet," but rather many options for a healthy diet, with some broad recommended guidelines, as well as specific guidelines that often depend on an individual's situation. People need energy and nutrients to be active and to maintain or build their body, but just as people's size, stage of growth, and activity differ, so too can their nutritional needs differ.

What is some additional information concerning the learning outcomes?

In general, the science portion of the fourth-grade proficiency tests is designed to assess long-term student learning—problem solving and thinking skills—and is not limited to rote knowledge and facts.

This type of learning, according to the State Board adopted model program, is best achieved through hands-on experience, the use of authentic science text, and long-term activities during which students ask questions, collect and analyze data, and make and explain decisions. In this view of science, students' reasons and processes to find answers are more important than their memory of facts. The more experience students have with collecting and analyzing data and information, and justifying their answers, the better prepared students will be.

The learning outcomes reflect the world view of science as both a body of knowledge and a process for

producing or obtaining knowledge; they also reflect the "hands-on, minds-on, inquiry-based" approach to science. Though manipulatives are not part of the science test, items with pictorial representations are frequent, and outcomes are assessed in multiple formats that address different learning styles.

How are the tests scored?

Each multiple-choice item on the test is worth one point; each short-answer item is worth two points; and each extended-response item is worth four points. Altogether, the thirty multiple-choice items are worth 30 points; the eight short-answer items are worth 16 points; and the two extended-response items are worth 8 points. The total test score is 54 points. (See Table VII on page 49.)

Conventions of writing (sentence structure, word choice, usage, grammar, spelling, and mechanics) will not affect the scoring of short-answer or extended-response items, unless there is interference with the clear communication of ideas.

Short-answer items will be scored on a *2-point* scale based on these general guidelines:

> A *2-point* response is complete and appropriate. It demonstrates a thorough understanding of the concept or task. It indicates logical reasoning and conclusions. It is accurate, relevant, comprehensive, and detailed.
>
> A *1-point* response is partially appropriate. It is mostly accurate and relevant but lacks comprehensiveness and demonstrates an incomplete understanding of the concept or task. It contains minor flaws in reasoning or neglects to address some aspect of the concept or task.
>
> A *0* is assigned if the response indicates no understanding of the concept or task.

Extended-response items will be scored on a *4-point* scale based on these general guidelines:

A *4-point* response provides evidence of extensive interpretation and thoroughly addresses the points relevant to the item. It is well-organized, elaborate, and thorough. It is relevant, comprehensive, detailed, and demonstrates a thorough understanding of the concept or task. It contains logical reasoning and communicates effectively and clearly. It thoroughly addresses the important elements of the item.

A *3-point* response provides evidence that an essential interpretation has been made. It is thoughtful and reasonably accurate. It indicates an understanding of the concept or task, communicates adequately, and generally reaches reasonable conclusions. It contains some combination of the following flaws: minor flaws in reasoning, neglects to address some aspect of the concept or task, or some details might be missing.

A *2-point* response is mostly accurate and relevant. It contains some combination of the following flaws: incomplete evidence of interpretation, unsubstantiated statements made about the text, an incomplete understanding of the concept or task, lacks comprehensiveness, faulty reasoning, or unclear communication.

A *1-point* response demonstrates a partial understanding of the concept or task but is sketchy and unclear. It indicates some effort beyond restating the item. It contains some combination of the following flaws: little evidence of interpretation, unorganized and incomplete, failure to address most aspects of the concept or item, major flaws in reasoning that led to invalid conclusions, a definite lack of understanding of the concept or task, or demonstrates no coherent meaning from text.

A *0* is assigned if the response indicates no understanding of the concept or task.

Facts from the Fourth-grade Proficiency *Field Test*

Test items based on the science learning outcomes were field tested in April 1995. While the number of students responding to each test item was limited, some general observations regarding student achievement can be made. The summary below is based upon review of student performance on multiple-choice items only. Scored examples of short-answer and extended-response items found on the practice test will be available in the winter of 1996.

- Student performance was highest on multiple-choice items measuring outcomes 2, 9, 17, and 19.
- Student performance was lowest on multiple-choice items measuring outcomes 3, 7, 8, 13, and 15.

For more information on science learning outcomes, see the Ohio *Model Competency-Based Science Program.*

To obtain further information on

Writing learning outcomes and/or the State Board adopted Ohio *Model Competency-Based Language Arts Program*, contact a language arts curriculum specialist (614) 466-2761 or (614) 466-1317.

Reading learning outcomes and/or the State Board adopted Ohio *Model Competency-Based Language Arts Program*, contact a language arts curriculum specialist (614) 466-2761 or (614) 466-1317.

Mathematics learning outcomes and/or the State Board adopted Ohio *Model Competency-Based Mathematics Program*, contact a mathematics curriculum specialist (614) 466-2761 or (614) 466-1317.

Citizenship learning outcomes and/or the State Board adopted Ohio *Model Competency-Based Social Studies Program*, contact a social studies curriculum specialist (614) 466-2761 or (614) 466-1317.

Science learning outcomes and/or the State Board adopted Ohio *Model Competency-Based Science Program*, contact a science curriculum specialist (614) 466-2761 or (614) 466-1317.

To obtain further information on

Fourth-grade Proficiency Tests, contact the Assessment Center (614) 466-0223.

Ohio Department of Education
Assessment Center
65 S. Front Street - Room 207
Columbus, Ohio 43215-4183

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